AMERICAN JOURNAL OF PHOTOGRAPHY

THOS. H. McCOLLIN, Managing Editor.
JULIUS F. SACHSE, Editor. XANTHUS SMITH, Associate Editor.

VOL. XIII. NOVEMBER, 1892. No. 155.

THE PHOTOGRAPHIC CONGRESS AUXILIARY.

IN connection with the World's Columbian Exhibition to be held at Chicago in 1893, it has been proposed to hold an "Auxiliary Congress of Photographers" at Chicago, some time during August of next year,—a scheme which, it is claimed, has received the approval and support of the exhibition authorities.

That a series of meetings of this kind would result in great value to all interested in the art science of photography, stands without a question; provided it would be intelligently and impartially conducted.

Thus far, to further this proposed undertaking, a committee has been appointed, consisting of eight persons, all residents of Chicago or immediate vicinity, including the chairman, who signs himself as "Chairman of the Committee of the World's Congress Auxiliary on a Congress of Photographers."

The only action of this committee which has thus far come to our notice, has been a "Preliminary Address," advising us of the appointment of an "Advisory Council" consisting of 120 members, all of which are supposed to have distinguished themselves in the various departments of the photographic art.

In analyzing the composition of this Advisory Council, it certainly shows some queer results. For instance, taking the American Section; it is remarkable how few representative photographers of national reputation are found among the committee and advisory council. In fact, a perusal of the list shows they are conspicuous by their absence. Further, it would be an inter-

esting item to know by whom or by what arbitrary standard this advisory council was elected. The forty-five American members which are supposed to represent the 49 States and Territories of the American Union, are selected from 23 States and Territories, thus leaving more than one-half, viz.,—26 without any representative. Of the fortunate States,—Arkansas, California, Colorado, Connecticut, Georgia, Indiana, Iowa, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, New Hampshire, Rhode Island, New Mexico, Utah, and District of each have one member.

Massachusetts, Missouri, Ohio and Wisconsin, have three each, Pennsylvania four, while New York carries off the lion's share, viz.,—eleven, or almost one-fourth of the American delegation. Why New Jersey, with her many active photographic workers, should have been ignored, can only be explained by the presumption that whoever made the selections, in their ignorance labored under the delusion that New Jersey was not a part of the United States.

But even stranger yet is the treatment accorded the photographic press of the country; while our weekly contemporary, the *Photographic Times*, is represented in the advisory council by its nominal editorial staff of three persons; and *Anthony's Bulletin* and the *American Amateur* are each acknowledged in the persons of their associate editors, the three most important photographic periodicals in the United States, viz.,—*The St. Louis Photographer*, *Wilson's Magazine* of New York, and the *American Journal of Photography* of Philadelphia, are ignored entirely. Why this should be we do not know; perhaps Chairman Bradwell or his associates can explain. Personally we have no grievance, but, as our western brethren would say, the whole matter certainly looks as if there was an Ethiopian of exceedingly large proportions concealed in the wood pile somewhere.

In the selection of the foreign members a general drag net seems to have been cast over the photographic sea, and the name of every person known in connection with photography raked in to parade as a member of the advisory council of the committee

of the "World's Congress Auxiliary on a Congress of Photographers." The total number of foreign members named in the preliminary address, amounts to seventy-five, divided as follows, viz.,—

Sandwich Islands, China, Finland, Chili, Buenos Ayres, Australia,—each one member.

Italy, Sweden, Holland, India, Canada,—two each. Japan three, Switzerland four, Austria five, Russia six, Belgium seven, Germany eight, France nine, England seventeen. Another interesting item would be to know how many of this list have accepted the preferred honor.

It has been the expressed desire in almost every quarter that the coming exhibition be a success in every department connected with the photographic art, and it is to be hoped that whatever committee be in charge will act with wisdom, care and *impartiality*, having in mind the advancement of the art, irrespective of personal favoritism or sectional jealousies, that we may not have a repetition of the disgraceful conditions which marked the distribution of awards at former exhibitions.

—J. F. Sachse.

Restoring Engravings.—It is often desirable to photograph old or rare steel engravings or copperplate prints which are yellow from age or are discolored by grease, stains of sulphate of iron, or other causes—blemishes which appear prominently in the photograph, and frequently mar the reproduction.

These annoying blemishes can frequently be removed from the original by a simple process, without running the risk of damaging the print, by simply soaking the print for about a quarter of an hour in warm water; then hold up to drain for about a minute, then lay face down on a sheet of blotting paper, leaving it to lie for ten or twelve hours until thoroughly dry. If all the grease or sulphate of iron has not disappeared repeat the operation.

When dry, put under pressure, and the print will usually come out perfectly bleached and restored, none the worse for the treatment, except with the possible loss of the plate-mark.

THE SIZE OF STOP TO USE.

BY W. K. BURTON, IMPERIAL UNIVERSITY, TOKIO, JAPAN.

SO MUCH has been written about "Sharpness versus Softness," and the like, that some apology is necessary for even referring to the subject again, and I should not do so but that, having expressed pretty decided views on the subject some three years or so ago, and having, after continual study of the subject since, had reason to modify these views considerably, I wish to have an opportunity of restating my opinion.

The views that I expressed when I wrote last on the subject were briefly that, in the case of a landscape, the principal object ought to be sharp, or nearly so, according to the taste of the artist, all reasoning tending to show that it ought to be as sharp as the best optical instruments could make it, but that objects nearer to or farther from the camera than this ought to be less sharp. My reasoning was that as, if in nature, we look on what is the principal object of the landscape, objects nearer or farther look "out of focus," we ought to try to reproduce this effect in the negative.

In the first place as to the sharpness of the principal object. I am more inclined than ever to think that, in most cases at least, this ought to be as sharp as it can be made in the negative at least. I say in the negative, because I admit that a charming effect is produced by the softening, or slight loss of definition that results from reproducing from a negative by certain processes. Thus to me the softness that there is in most pictures produced by intaglio copperplate photo-engraving is a totally different thing from the effect got by printing in silver, even on matt surface paper or in platinotype, from an ill-defined negative. The one effect is beautiful, the other, generally at least, is not. It seems to me that those whose taste leads them to avoid absolute sharpness in any part of a picture would find it best to get the softness they want in the after process of printing rather than in the negative. Mr. George Davidson has described various ways of producing such softness from a negative in which the definition is quite sharp.

Even if it is decided to get softness, or slight want of definition, in all planes of a negative, it is to be borne in mind that this softness may differ in quality. Thus the softness got by admitting an appreciable quantity of spherical aberration is quite different from that got by putting the whole of the picture a little out of focus. The softness got by admitting a little spherical aberration is of a much more pleasing kind than that got by putting the image out of focus. The reason is that, in the former case, the image may be said to consist of one of perfect definition, in the latter case there is nothing but lack of definition. It is for this reason that I have often stated that an optical desideratim is a landscape lens with an adjustment whereby a *large quantity* of spherical aberration can be introduced at will, so that what softness is wanted may be introduced even when a small stop has to be used on account of nearness of foreground objects.

Now as to making the principal object the sharpest (strictly speaking the most nearly sharp) in the picture, whether or not it be made absolutely sharp, I am afraid this is a doctrine that does not hold good. In the first place many pictures have no principal object, or no object of which it can be said with any degree of confidence that it is the principal object. Much more important, however, is the following fact: If there be any object in the foreground, the least conspicuous, even if it is not an object of particular interest, and if any more distant object be made sharper than this, the effect is distinctly bad. In other words, it is necessary to focus for the nearest object that is in the least conspicuous, apart from whether it be the principal object or not, and it very seldom is the principal object.

Now as to whether the rest of the view should be put distinctly out of focus or not. There can be only one object in putting the more distant parts of the landscape out of focus, and that is to give an impression of distance, the thing in which photography most commonly fails. The question is, does this leaving out of focus give the impression of distance or does it not? I have no hesitation in answering that there are cases where it does, and that there are cases where it does not, but where the only effect of leaving the distance out of focus is a totally unnatural one. If

this be granted the natural question is, In what cases is it of advantage to leave the distance out of focus, in what cases should it be sharply focused? To this I am sorry to say I can give no answer farther than that continual observation and experiment will educate the eye to be able to tell whether or not the idea of distance will or will not, in a particular case, be given by the use of a large stop. By experiment I mean the taking of two or more negatives of the same subject with stops of different sizes, no adjustment of focus being made between the exposures, and comparing the resulting pictures. This is a thing I strongly advise to those who wish to study this matter, which is of the utmost importance to landscape photographers. It may be asked, Why take negatives? the effect can be seen on the ground-glass. There may be some gifted enough to tell exactly what the print from a negative will look like by examining the image on the ground-glass, but I think they are very few. The difficulty arises from the want of light, except when a very large stop is used, and from the fact that it is all but impossible, as a rule, to see the image on the ground-glass as a whole.

There is one thing I incline to state, although with some diffidence. It is that, when the impression of distance is really rendered in any other way, as by the correct representation of atmospheric haze, there is no necessity to add an out-of-focus effect, and it is generally a mistake to do so.

There is another difficulty about leaving the distance out of focus. We have not the power of controlling to what extent the different planes shall be out of focus. The relative want of sharpness is purely a function of the distance. Thus, suppose we have a well-marked foreground, an object at a considerably greater distance that is distinctly the "principal object," and a "distance." The foreground, as has been stated above, must be made at least as sharp as any other part of the picture. The principal object may, perhaps, be made a little less sharp, but that is all. It may be desirable in this case to leave the distance quite appreciably out of focus, but this is generally impossible. If the "principal object be several times farther away than the foreground, and the latter be focused for, there will be no appreciable difference in

sharpness between the principal object and the distance. There are some cases where the difficulty may be got over by focusing for a plane between the foreground and the principal object, but they are exceptional.

Talking of foreground induces me to express the opinion that very few photographers seem to appreciate the importance of foreground—or perhaps they are debarred from making the best use of foreground by the extreme difficulty of treating it. I mean here, foreground quite close to the camera. We have only to look at the work of any good landscape painter to see what a power there is in foreground, at quite a short distance,—what an amount of relief it is capable of giving to a picture. Such foreground does not need to consist of important objects. A stem or a branch of tree, a bit of a road, a few agricultural implements, or a little foliage will do.

There are several difficulties in the case of rendering such foregrounds by photography. One is that of focus. This is especially felt in the case of large work, and where long-focus lenses are used. There is a certain class of photographer that is continually laughing at the *f*-32 man. Of course a man who makes a habit of using *f*-32, or any particular stop, in all cases, deserves to be laughed at, but if due attention be paid to foreground, I have no hesitation in saying that it is often necessary to use a stop much less than *f*-32 to get the foreground and the rest of the picture even fairly into focus. This brings another difficulty,—namely, prolonged exposure, and, as the most appropriate foregrounds for the work under discussion very often consists of foliage, which is very seldom still, the difficulty becomes serious. There is still one difficulty more, and that arises from the tendency that photography has to render such near foregrounds as I have been writing of too dark. This can often be got over by appropriate selection, in other cases by skillful manipulation of the lens cap. Only in some stereoscopic work done at the time that the stereoscope was so much used that the masters of landscape photography produced pictures of it, have I seen foregrounds treated as I here describe.

It seems to me that many of those who have no part of a photograph sharp fall into a certain error. They state that the defect of ordinary photographs is the want of "breadth." There is no doubt they are right here, but they seem to go farther. They appear to think that if definition be suppressed by having no part of a picture in sharp focus, breadth will result. But will it? In the first place is "breadth" of effect obtained by artists by suppressing detail? To a certain extent it is, but I think it is effected more by emphasizing salient points. But even so far as the detail goes, I cannot see that leaving the picture out of focus suppresses this detail. It only confuses it, and, in some cases at least, makes it more conspicuous than it otherwise would be.

How to get "breadth of effect" is certainly the great problem for photographers. Beyond selection of subject, and occasional manipulation of the exposure so that one part of the subject gets more than another, I can see nothing to be done but to "dodge" the negative in printing, sometimes by shading one part of it for part of the exposure, sometimes by working with pencil and stump on tissue paper stretched on the back of it. And I believe the purists, who are just those who most recognize the lack of "breadth" in photographs, consider this practice illegitimate.

However this may be, I wish to impress on landscape photographers that the very highest judgment can be exercised in deciding (1) what plane of a subject shall be focused for, (2) what stop shall be used. Indeed, the differences of effect that can be produced by varying these two factors alone are so great that it ought, I think, to entitle photography to rank as a high art.

One of the earliest efforts at the reproduction of ancient manuscripts, was the attempt made in 1856–7 to reproduce in fac-simile the *Codex Argenteus* of Ulfilas, the oldest sample extant of Gothic language, it dating from the fourth century, and is in the great mother tongue of the whole German race.

A NEW PLATINUM PROCESS.

BY P. GANICHOT.

AFTER numerous and varied experiments to prepare a good platinum paper, I finally settled upon the following method, which gives excellent results.

To prepare the sensitizing solution dissolve

Ferric chloride (dry), . .	25 gr.
In water distilled, . .	1,000 ccm.

Then filter and add a small portion of ammonia, until no further precipitate forms. This mixture forms a ferric hydrate in the shape of a reddish brown paste, which in turn is to be poured into a filterer and washed until the water ceases to taste salty, then dissolve

Oxalic acid, . . .	50 gr.
In water, . . .	150 ccm.

Bring this to a boil and slowly add the above ferric hydrate which will dissolve.

This solution should be a saturated one, and show no acid reaction. To insure absolute neutrality, it is therefore advisable to add a slight surplus of the ferric hydrate, which will remain undissolved.

Above solution is to be filtered, after which add

Chloro-platinate of soda, . .	25 gr.

and the volume brought up to 250 ccm. by addition of distilled water. In case this solution becomes turbid, it is necessary to again filter. The solution is now ready for use, and in the dark keeps for an indefinite period.

Any suitable matt paper, which has been previously salted with arrowroot or gelatine, will answer for the purpose, and can be sensitized in the usual manner by the use of a broad brush.

It is of primary importance that the solution be applied merely upon the surface and that it shall not penetrate into the paper, otherwise the prints will not be brilliant. After the solution has been evenly applied to the paper, the sheets are hung up to dry

Naturally the sensitizing and drying must be done in the dark room.

The exposure is made under a negative in the usual manner; after sufficient exposure the print is developed in the dark room in following solution, viz.:

Oxalic acid, . . .	25 oz.
Chloro-platinate-soda, . .	2.5 g.
Water,.	250 ccm.

The print gradually gains in intensity, and loses the reddish-yellow color of the oxy-ferric-hydrate which it shows after the exposure.

The presence of the chloro-platinate of soda in above solution is of importance, as it furnishes the platinum necessary to form the desired image, the quantity contained in the paper not being sufficient to produce requisite density. As soon as the image is intense enough, and before it becomes grey, it is to be taken out of the developer, washed thoroughly and hung up to dry.

As the print loses none of its density in the successive washings, it need not be developed further than actually wanted.

This exceedingly simple and cheap process gives artistic results and permanent pictures. It further gives pictures with fineness of detail without exaggerating the contrasts. Further, by the use of chloro-platinate of soda the necessity of extraordinary precautions against dampness is obviated, as it may be kept the same as ordinary albumen paper.

Finally, the process is a very economical one, notwithstanding the continual advance in the price of platinum; this is in consequence of the minimal percentage of the salt used in the preparation of the paper, a finished print costing but one-fourth as much as an ordinary silver-print of equal size, irrespective of the advantage of finer modulations and greater permanency.—*Bull. de la Soc. Franc. de Photo.*

It was Sir J. W. Newton who stated that the object should be taken within six feet from the lens, or it will appear distorted.

THE HIGHER REFINEMENTS IN DEVELOPMENT.

XANTHUS SMITH.

THE peculiar relations and tendencies of different nationalities to art would form quite an interesting study for any one who might feel inclined to prosecute it.

We see such markedly distinctive characteristics holding on to different peoples, or rather different races holding on to such widely different qnalities, that one feels curious to know what principles may be governing man's mode of seeing and portraying what he sees. The Chinaman makes a wonderfully different affair of a landscape scene from what a European does, and, the Chinese may be said to be an artistic people in one sense of the term, and with what we consider our nicer judgments we Europeans see wide differences in our own arts. The Germans, for instance, have the reputation of being harsh, inharmonious colorists, whilst their near neighbors, the Dutch or Flemings, are noted for their harmony of coloring. The English color beautifully, but are said to draw badly, and the French though fine draughtsmen may well be accused of adhering only to the trivial or the disagreeable in subject.

Up to some fifteen years ago, when we here in America prided ourselves on our nationality and individuality, we were running into a remarkable perfection in art. Owing, it would seem, to a lucky union of the various excellences of European art, conglomerate as we are, and new, there was in our school, if it might be so called, a complete breaking loose from old traditions, and a healthy going to nature which gave our work a freshness and truth which had not before been equalled, and had not the unfortunate check taken place through the whim of fashion, which has made it vulgar to be American in anything, especially in art, we would undoubtedly now have been one of the greatest of art people. Further, it has been the greatest misfortune that American art should have become French, because the French do not love landscape nature, and court the disagreeable in almost everything. They hate the grand and the beautiful in landscape art. Had Americans turned their attention in the direction of England, if they must

be foreign, how different would have been the influence. Englishmen love nature, they love beauty, and what is best of all they love all that is good and pure and high and holy in nature and art.

All must admit that truth is a prime quality in anything, and in art beauty and truth, we think, should stand first, and those people who give us the most beauty founded upon the most truth should stand highest.

But, it will be asked, "What has all this to do with photography?" This much, we reply. That the English love for truth and beauty in art, is certainly influencing English photographers in the direction of an elevation, and perfection in their branch of art, which must appeal acceptably to all those who have either actual knowledge or natural good taste in such matters.

We are all familiar with the efforts made in England, by the leading men in the photographic art, to elevate their work out of the mere mechanical, and always, we may say, with a fair knowledge of the capabilities and limitations of their means. In their genre compositions, and artistic effects in landscape, they lead against all other competitors, but to what we would now call particular attention, as showing their refined feeling for the highest excellence, is the attention that is given to the matter of the development of the latent image.

To those who have read carefully the leading British journals for the past year, the discussion which has been in progress, of the subject of the composition of the latent image, and its development, must have been particularly interesting. Certain statements made by Messrs. Hunter & Driffield, and the numerous criticisms of them by the most able investigators and workers in photography, show how keenly those refinements of the art which give it its most subtile beauties, are sought after and appreciated.

What may be called the building up of the image in the developing tray, by the action of certain agents is a subject of never tiring interest to the careful photographer, and especially to the amateur, who is supposed to be able to expend more time and pains upon each individual plate than the professional, who is generally hurried by large orders for work, and much depend-

ent upon his assistants. Nor is the amateur supposed to rely so much upon retouching, which in portraiture is often the sole dependence of the professional for the attainment of the variety of gradations which should exist in a good photograph.

A careful perusal of what has been written in the discussion upon development, referred to, will tend greatly to confirm the views already arrived at by careful experimenters. That we have great influence in development there can be no doubt. Of course the time of exposure given a plate is an exceedingly important consideration, so much so indeed that if we could expose our plates with certainty the precise length of time which they should be exposed, we could have perfect work with but little trouble in the after process of development, but, unfortunately, the latitude in exposing the most sensitive plates is so very small that the question of modification or improvement of incorrectly-timed plates in development becomes an exceedingly important one. We feel more than ever confirmed in the belief that a vast deal may be done in under- and over-timed work, of course omitting extremes, to produce a comparatively perfect result, by well advised management of the agents employed.

In the case of under exposure our aim must be to retard the building up of the lights while we are getting all the detail attainable in the shadows, and with over exposure to build up as rapidly as possible the lights at the same time retarding the veiling of the shadows. Of course it will be seen that in the one case we must get in the strongest work we can by the alkalies, sometimes even unaided until the last by the developing agent used, and in the other the alkalies must be kept in entire subordination to the pyro or hydroquinone or eikonogen as the case may be, at the same time giving full play to the bromide. By such care, we think, it will be found not only that the simple flatness or thinness of a negative or its over density may be corrected, but that the whole may be proportionately built up, all the nice gradations from the highest lights, through high-light, middle tint, and half-shadow to the deepest shadow being preserved, thereby securing those refinements of the art which constitute its greatest perfection.

OPTICAL GLASS.*

A MORE exact title for the paper would have been "Glass for Optical Purposes," although that is not a sufficiently precise definition, as all glass which we apply in order to see through it is, in a sense, "optical." But I should have to use a pretty longish term to define exactly what is meant by glass for optical purposes, and we may proceed to the more concrete part of our subject without leaving any doubt in our minds as to what we are talking about.

Antiquity of Optical Glass.

We know for a fact that optical glass was in existence before the Christian era; I do not mean to say that it was equal to Chance's dense flint, but being used "optically," it was optical glass—at least, in its application. Claudius Ptolemy, the Alexandrian astronomer, living about the second century B.C., wrote a treatise on optics, refraction and reflection, and on lenses and mirrors. Copies of his works are said to exist in the Bodleian Library at Oxford, and in the Royal Library at Paris. We are, therefore, not talking about a new thing, either as regards lenses or with regard to "optical glass." Other works of a similar kind exist, one of the best known being that of Roger Bacon, who, in the thirteenth century, wrote his *Opus Majus*. He has, in fact, been looked upon by many as the inventor of the microscope, and the telescope too. We are told where his "optical glass" came from.

You are all familiar with the story of how Galileo came upon the form of telescope which bears his name, but he does not possess the laurels alone, for we have it recorded that telescopes were made in the year 1600 by a Dutchman named James Metius, at Alkmaar, in Holland.

During all this time optical glass must have been procurable from somewhere. It is, however, very evident that the make of what we *now* understand by optical glass must be a modern thing, for it is evident that before Newton showed the different refrangibility of different parts of light, there could have been

* A communication to the London Photographic Club.

little room for such an establishment as the one now in existence at Jena, where glass can be made to order with a given index of refraction calculated beforehand to the third and fourth decimal for any part of the spectrum.

What is Optical Glass.

Glass was made, we know, something like 1600 years before the Christian era in Egypt, and, as it was soon ground into lenses, it must have been "optical." When glass becomes so pure that we can speak of its refractive indices, and of its spreading or dispersing the light in regular or even measurable ratio, we look upon it as optical. The crown and flint glasses, so called, are those we use for optical purposes. Crown glass is a plate glass, or *vice versa;* flint is a glass charged with lead. That for optical glass the finest and purest of materials must be used goes without saying. White sand is used, pearl ashes, borax, cobalt, manganese, and other ingredients, and as a matter of fact, hardly any glass is made without the addition of some pieces of broken glass of the same kind. Flint glass is also made of fine white sand, red lead, fine pearl ashes, nitre, arsenic, and manganese. Many of the modern optical glasses contain other additional substances, which I shall refer to later on. Flint glass was formerly made from flint ground up; but I understand it is not used now.

In England, Chance Brothers, of Birmingham, have for years produced some fine specimens of optical glass—notably, their heavy flints; and in France, Feill, of Paris, has made glasses in many instances exactly of the same character. In Germany nothing was produced on any large scale since the death of the great Frauenhofer in 1826—who made his own glass—until lately, when, after some experiments, carried on during a number of years, the scientific world was taken by storm with a series of glasses such as we had never had before, opening up new means of improved construction for all sorts of optical instruments, notably also the ones that will interest you most—the photographic objective.

It is very evident that, as far as the manufacture of optical glass on a truly scientific basis is concerned, there was much left to be desired by the state of things up to 1885 or 1886, and there was no means of eliminating certain errors of a chromatism entirely even from the finest instruments of the most renowned makers.

Several attempts had been made, notably in England, to bring about a more satisfactory state of things, and after the work of Frauenhofer had been cut short an Englishman, Harcourt, made experiments between 1834 and 1860, in all about 160 different pots, but he had not the technical assistance necessary; and, apart from some attempts which seemed to point in the right direction, he wasted much time in making glass containing titanium. This glass, which he principally made with a view of eliminating the secondary spectrum, did not answer, but it showed the possibility of getting rid of this secondary spectrum once the right material was found and applied in the right way.

Abbé and Schott's Experiments.

Professor Abbé is said to have come to the conclusion that the then existing state of things with regard to optical glass specially for microscopes could only be remedied by the creation of entirely new materials, and he gained this conviction after a visit to the exhibition of scientific apparatus in London in 1876. He communicated with Dr. Schott, who then lived in Hanover, and the idea of creating a new establishment for the production of improved optical glasses was accepted by both.

The principal object was to produce such glasses as would allow the elimination of the so-called secondary spectrum from the objectives, especially from the microscope, the instrument which suffered more than any other from this defect. Experiments were begun in 1881, and conducted on a small scale until 1883. From that date experiments on a large scale were undertaken, and with the help of some 60,000 marks contributed by the Prussian Government from the fund set apart for scientific research, many new kinds of glass were experimentally produced which, in combination with others of the known or of new

kinds, would allow of combinations in which the chromatic or spherical aberration could, to a great degree, be corrected, and the secondary spectrum be almost eliminated.

This is accomplished by improved crown and flint glass mostly with mixtures of boracic or phosphoric acids, while greater variety in the refractive and dispersing powers of the glass was obtained by applying baryta, magnesia, and zinc oxides. Thus, up to now, something like eighty different kinds of glass have been put on the market, and experiments have extended to more than 1000 kinds of glasses or compositions of glass.

The materials that have finally been adopted are several series of new glass, as the phosphate crowns, barium phosphate crowns, boro-silicate crown, barium silicate crown, etc., borate flint, boro-silicate flint, a special silicate flint, and a light baryta flint.

Advantages of the New Glasses.

The great advantage which the constructing optician has gained by the establishment of this furnace is, that he can obtain any of the glasses enumerated in the catalogue always alike, and with increased precision for the measurements of the refractive indices. Nay, more, he may require a glass slightly different in refraction at one or the other part of the spectrum, and he can obtain it; but the variety is in itself so great that for almost any special purpose a glass will be found that will answer. Moreover, formerly, every batch of glass turned out had to be examined in the spectrometer, and its refractive indices ascertained, while now they are precisely given for every pot, as well as the amount of dispersion for the principal parts of the spectrum, and the specific weight. As most of you know, the usual mode of specifying glass is given by the refractive indices of the sodium line D (double line), and of the three hydrogen lines, C, F, and G. The measurements at Jena are, however, also made on the line A, the potassium double line, so that their measurements are made on five lines of the spectrum, A, C, D, F, G.

Their catalogue indicates for every kind of glass—the refractive index for D, the brightest part of the spectrum, the mean dispersion from C to F, following which is given the proportional

or relative dispersion. The glasses are enumerated in order of this last factor, which allows at a glance a comparison of the refractive and dispersing values of glasses to be combined.

I found, some years back, that in some heavy flints made by Chance these indices agree exactly with some glass of the same kind made by Feill, of Paris, so closely as to show the same figures up to the third decimal. If you had asked any of these makers to make two pots of glass exactly alike to that degree they could not have done it, or, at least, could not have guaranteed it to come out absolutely the same. Hence a new batch of glass had to be studied spectrometrically before much else could be done with it, and much of that labor is saved to the constructing optician by the precision in which the Jena people specify their productions.

Such a profusion of new material is a great boon to the constructing optician who has been hampered by the insufficiency of the material at hand formerly because of the impossibility to fully achromatise with flints and crown glasses, or even with two flints combined, because of the disproportionate dispersion of most, if not all, the heavy flints, as compared with crowns or of light flints. Many of the new glasses combine much better, and the result is that lenses can be constructed giving much flatter fields with the same angular apertures and better achromatism into the bargain. When the combined glasses allow the achromatising in three different parts (colors) of the spectrum, the so-called secondary spectrum is said to be eliminated, and the correction is for most purposes complete. This is of great importance in microscopic lenses, but for photographic lenses it is of less consideration.

Identity of Jena and English Glass.

We find that at Jena they now produce exactly the same glass as the former glass made by Chance Bros., as, for instance, their No. 8, which we learn to be a "calcium silicate crown." There is another, No. 12, also corresponding to Chance's "soft crown." It is a "barium silicate crown." Their No. 38 again corresponds to Chance's extra dense flint. They call it "heavy silicate flint."

And finally, No. 40, another heavy silicate flint, corresponding to Chance's double extra dense flint. You will see that all these flints have a high index of refraction for the D region of the spectrum, such as 1.7174 for the least, and 1.65 for the former.

You will see by a perusal of the Abbé-Schott catalogue, that for photographic purposes mostly the silicate crowns or flints are useful, and also some of the baryta flints, most of which are colorless, or nearly so, while the *borate flints* are not to be employed for photographic purposes, on account of their being affected by the atmosphere. They will, however, be valuable for the microscope, where they can be protected by another kind of glass forming the outer lens or lenses.

Some Properties of the Jena Glasses.

The glasses which have proved to be of great value to the photographic optician and photographic purposes generally, are the baryta flints, on account of their proportional high refraction, that is, a refraction of a considerable angle. This permits of lenses being ground with much flatter curves, inner and outer, and the result is a much flatter field obtained at the focal plane. As an instance I can mention Suter's new rapid aplanat D, which is made of such glass, and was, in fact, one of the first lenses manufactured out of this material, the curves of which are much less deep than any lens previously made of such intensity, viz., *f*-5.5, No. 2 u.s.

Voigtlander had made a lens of nearly the same angular aperture previously, but I do not believe they were kept going for any length of time, and the series have disappeared from their catalogue or are replaced by lenses of a newer construction. Suter had, in fact, made a lens previously of the same aperture (*f*-5.5, No. 2 u.s.), of which there were issued some few ; but they were dropped in favor of the new construction which the Jena glass permitted, and a great gain in even illumination, rapidity, and flatness of field was the result, besides a much more complete correction of chromatic aberration. Dallmeyer had also once produced a lens said to have almost double the aperture of a rapid rectilinear, but it was not, I understand, issued on the

market. I am, of course, speaking of cemented double combinations, not of triplets or lenses with separated back glasses.

These attempts of opticians to construct lenses with greater apertures, and so few faces only, were frustrated simply on account of the want of suitable material. Now that the material is at hand, no difficulty exists, and in the hands of our able opticians plenty of these instruments, of excellent quality, are produced. The usual objection which was made as to using the new material, the one that it did not keep, has now pretty well been silenced, and English opticians, after some hesitation, have begun to use the material freely, and will no doubt produce excellent instruments from it.

The values of the several series of new glasses have been ably brought to the practical tests by the Zeiss anastigmats, which are now largely manufactured, and for which license has been granted to a number of leading opticians, such as Voigtlander, Suter, and, in England, to Ross & Co. These lenses accomplish successfully what was, with the material previously at hand, tried repeatedly, but not with good results, viz., a lens of the rapid type, that is, with an aperature of *f*-8 and larger, which at the same time can be used as a wide-angle lens, and which, with the full aperture, already embraces a covering angle of about 60°, as is the case in the Series III.

Manufacture of the Glass.

With regard to the manufacture of the glass, it would be a vain attempt to write a description without a good set of illustrations; but some idea may be gained of the nature of the operations when we are told, for instance, that the making of silicate glass will take close on to three weeks. The pot, or crucible, in which the glass is to be "cooked" is, after being well dried, heated during four or five days until it attains a red heat; it is then put into the oven where, as soon as it has reached the temperature of melting glass, a few pieces of glass of the kind to be made are put into it, and as they melt the inside of it is well glazed out with the molten glass.

The crucible is now filled with the sand and chemical substances that are to make the pot of glass to be produced. When this is thoroughly melted and worked into a homogeneous mass the crucible is brought to a greater heat still, which is supposed to thoroughly digest the glass and drive all the air out of it. This lasts six to eight hours. The glass is now tried, after being thoroughly stirred with a rod, and found homogeneous and free from air bubbles and clear. It is then tried on the blow-pipe. If the pot proves to be in good condition it is taken out of the oven by a crane,—it may weigh some fifteen to twenty cwt., or about a ton. It is then left to stand and "gently simmer" so as to cool down a little, is then brought into another oven, in which a second crucible has undergone the preliminary warming process, and which is intended for the next pot of glass of the same or a slightly different composition. In this oven the glass is left about three days to cool; the contents harden up—dry up—as the melters say, and on "drying," or hardening, break up into a number of fragments.

The crucible is now broken up and the contents cleaned of any impurities. The clear, transparent pieces are next subjected to the "setting" process. By this they are heated to about melting point, having been laid into moulds, where they adopted the desired forms of discs or slabs as required. This is done in a special oven, to which a cooling oven is attached. The cooling takes ten to twelve days, and the pieces are finally taken out, and two edges or faces are cut, so that through the polished surfaces —which, as you see in the samples, are always opposite to one another—the glass can be examined. The net result of usable glass amounts to about twenty per cent. of the quality melted in a pot, and that is considered a good percentage.

This is the ordinary procedure for the bulk of glass intended for ordinary purposes. For special glass, such as large telescope object-glasses, a special process of cooling is employed, of which I can give you no special information: but a circular of the firm of Shott sets out some points of examining discs of sizes up to, say, fourteen inches, and for which they have adopted what they call fine annealing, which consists in storing the glass in a vessel

the temperature of which can be accurately measured, and which is made to cool down at a very slow and uniform rate, and can be regulated according to requirements.

Testing the Glass.

Most of you may be acquainted with the mode of testing such discs or lenses by use of the Nicol prism. It consists of placing a lens or disc of glass, or a plate, between two polarizing prisms, rotating the one until the light is polarized, and then observing the more or less regular figure of a cross on the disc; the regularity of the cross proves the homogeneousness of the glass. An irregular cross will be proof of tension in some parts of the disc.

It now remains only to put before you some samples that I have here to show, most of all of which are suited for photographic objectives, and all of which, I am told, may be looked upon as unaffected by the the atmospheric influences. Most of these glasses are almost free from color, and you will see that a number of them are light flints, which now take the place, in a degree, of the former heavy flints, by which alone the high index of refraction necessary for some instruments could be obtained. This is, as I have shown, a great gain.

Lieut. Peary, the Arctic explorer, and his heroic wife, whose portraits we gave in our last issue, have since returned to Philadelphia from the frozen North. During his sojourn in the Arctic Circle, a No. 4 Kodak was his most constant companion, even while on the sledge trip of over 1500 miles across the Northern ice-cap of Greenland and return. The 82 parellel was the most northern point reached by Peary and his solitary companion, and marks the farthest limit thus far brought under the influence of the camera, and the sensitive films of modern photography.

Over 1,300 exposures were made by the intrepid explorer during his memorable sojourn in the land of the Eskimo and polar bear. These films are now being developed by a Philadelphia photographer, and we trust will add much to our knowledge of the appearance of life in the frozen North.

AIMLESSNESS.

BY F. C. LAMBERT.

IN looking over an ordinary collection of miscellaneous photographs one is very apt to be impressed, and depressed, by a general feeling of weariness, accompanied by the consciousness of being surrounded and bathed in an atmosphere of misspent energy.

To put it briefly, one feels that the game bagged is not at all proportionate to the powder expended. And pondering over this matter it seems to be due more to want of aim rather than bad shooting; reminding us of the fisherman's friend who observed that "that those people who aim at nothing generally hit it."

To take the average case of the ordinary photographer, who loads up his double backs and sallies forth for his day's outing, one may ask, "What are his aims?" Gentle reader, we may ask, but for answer echo only answers "What?"

The fatal facility of modern processes tempts many a one to burden himself with many pounds of baggage, tramp many weary miles, etc., etc., "on the chance of something turning up," usually with one of two results.

In the first case, the laborer is anxious to be "at it," and fires away at the first rustic bridge, or milestone, or other thrilling object he finds.

The half-dozen plates are soon "polished off," and then, perhaps, sets in a wave of doubt, not to say repentance.—*e. g.*, "Wish I 'd saved a plate for this." "Half think that last plate won't be up to much." Or, on the other hand, our more lethargic friend is tardy in beginning. "Don't see anything worth doing hereabouts;" but having carried his burden so far, he does not feel inclined to return empty-handed. "Must use the plates, you know;" and so he "takes" anything, "just to use the plates." In both cases our friends have aimed at nothing and hit it too.

"Now, it is easy enough to criticise and to talk," say our friends, "but, what would you have us do?"

Firstly, then, let us remember this truism. If we fail to see any reason why we exposed this or that plate, it is hardly to be

expected that our friends will see very much in the resulting print, except it be a warning not to rely too much on chance firing.

Secondly; if a man goes out picture hunting, and has little or no idea what to look for, he has not much chance of finding anything of value; or rather, if he does stumble upon something really beautiful, there is but slender chance of his perceiving its beauty.

Now, despite all that has been said against set subjects (much of this being true enough), it still remains that a list of suggested subjects would, with many otherwise aimless workers, have at least the effect of helping them to keep their eyes open.

It seems to be a growing opinion among those who ought to know from experience, that club outings—*i. e.*, "photography in bulk"—usually consist of about equal parts of fooling and feeding. Whereas, had the party of, say, a dozen, been split up into six couples, the results would be more worth preserving. In addition to this, it might be suggested that if one or two members who knew something of the district to be visited would place their experience before those members who intend joining the expedition, and then the whole party agree upon, say, some half-dozen general ideas to be kept in memory, then while each would be free to follow his own bent (if he had one), he would also be on the lookout for, and seize upon, any scene which to *him* seemed capable of expressing any of the suggested ideas. Finally, to give interest to the suggested subjects, an evening being appointed, members should then bring up prints, or show slides, and discuss the success or failure in carrying out the main idea. In some such way every worker would learn something from each of the others who had anything to compare with his own work.

Now while admitting that we cannot make pictures like puddings, *i. e.*, by receipts, yet the fact that we were put upon our mettle to give the best suggestion of, say, industry, solitude, wind, etc., would have a wonderful effect in sharpening the eyes of many who would be otherwise just "snapping off a few plates for the fun of the thing." To take the first of these suggested ideas,

one may well imagine a dozen very interesting and totally different pictures almost equally well expressing this theme. The comparison of, with a friendly discussion upon, these attempts would yield abundant material for a most interesting meeting, in which every one of the dozen workers would learn something from each of the eleven others. It may be urged that there is a dearth of subjects, or that English people and places do not lend themselves to ideal treatment. This is a confession of incompetence rather than lack of material. It is enough to refer to our native poets and their pastoral subjects. It will suffice to quote perhaps the best known of English pastoral word-pictures, *viz.*, Gray's Elegy. Painters find in it endless suggestions; why not photographers?

Laying aside the idea of working out an idea, or, rather, expressing thought pictorially, there is yet quite another direction in which much good work cries out to photographers, *viz.*, systematic, careful work along a definite line.

The present writer has a friend who year by year spends his holidays in a different cathedral city, and in that way is making a splendid collection of most valuable work. The building as a whole is carefully studied from various points of view, suitable lighting chosen, etc., and, added to this, numerous detail studies are made with the utmost care.

One may well imagine an interesting collection of pictures to be made by thoughtful working along a certain river or dale; or, following the great Turner's lead, one might do worse than study the harbors of England.

This much, however, will scarcely be disputed, *viz.*, that it is better to have ever so humble an aim, even to descending to what one very high art teacher affects utterly to despise and contemn under the name of "mere topographical things," than to have no aim at all. A simple tale simply told is to not a few quite as interesting as the high-faluting, grandiloquent rhapsody of a pictorial Hamlet.

—*The Photographic Review of Reviews.*

OUR CURRENCY.

THERE are in the United States so many kinds of currency, that it is not strange that misapprehensions and a confusion of ideas should exist on the subject at home as well as abroad. First in order is the gold coinage, the basis upon which the whole circulation of the country rests. Should this become weakened the entire system would be likely to fall into confusion. The gold dollar is the only recognized legal "unit of value." By it only is measured the value of all foreign coins and bullion, whether of silver or gold. That the gold dollar rests on its own basis independently of government fiat, is seen by the fact that gold bullion is of the same value and performs the same function as the gold coinage in monetary transactions. The case is very different with the silver dollar and silver bullion. According to the latest estimate of the director of the mint, the stock of gold coin and bullion in the United States, including the coin in the treasury vaults, in the banks and in circulation, amounts to $687,000,000. As nobody can tell how much gold may be stowed away in stockings and other hiding places, this estimate is largely based upon conjecture so far as the gold in private hands is concerned.

Next come the standard silver dollars, of which a little more than $57,000,000 is in circulation, and about $357,000,000 is piled up in the vaults of the treasury. Upon this coinage, authorized by the act of 1878, about $327,000,000 in silver certificates are in circulation. The small remainder of silver certificates is in the treasury, to the amount of about $4,000,000. These certificates are legal tender for taxes, custom-house duties and other demands of the government. Under the act of July 14, 1890, no more of this class of silver certificates can be issued.

The greenbacks, the remainder of the legal tenders issued during the war, amount to $346,681,016, of which about $100,000,000 constitutes a portion of the reserve of the national banks. These greenbacks are a floating debt of the government, and while their amount cannot be increased, they may be issued and reissued as fast as returned to the treasury. For their redemption $100,000,000 in gold is held as a treasury reserve.

The national bank notes amount to $172,476,575, of which $168,067,089 is in circulation. The rest is "cash" in the treasury. While the national bank notes are not a legal tender in general, the national banks must accept them at par for all demands. This makes them legal tenders for all practical purposes.

Under the act of July, 1890, new silver certificates to the amount of $105,000,000 have already been issued for the purchase of silver bullion, of which upward of $100,000,000 is in circulation. They are legal tenders for all debts, public and private.

Of the gold certificates, of which $175,644,879 has been issued, $153,000,000 or thereabouts is in circulation; but most of this issue serves as a convenient reserve for the banks.

The subsidiary silver coinage amounts to $77,433,950, about $63,000,000 of which is in general circulation, and the rest is stored in the treasury vaults. This coinage is legal tender for no greater sum than five dollars.

Lastly, there are the current certificates, under the act of 1872, amounting to $30,550,000, nearly all of which are in general circulation.

This makes nine different kinds of currency, the total sum of which on the 1st of July, 1892, amounted to $2,241,096,694. Of this amount $1,529,316,833 was in circulation on that date, and $627,524,450 was in the treasury. This whole fabric of currency rests upon gold as its base—in theory, at least, if not in fact. Whether the enormous volume of silver and of paper certificates upon this silver can be kept at par with gold will depend on the future policy of the government. If unrepealed, the bullion act of 1890 will sooner or later bring the currency to a silver basis.

An Old Method for mounting photographs, and which it was claimed absolutely prevented the fading of the prints, was to first coat the back of the prints with a solution of gutta-percha in benzole, a mixture which dries in a few minutes. The print was then attached to the mount with a paste made of gum-dragon and water. The theory of the process was that the coating of rubber prevented decomposition of the paste, or deleterious chemicals from affecting the silver print.

PREPARATION OF PURE SILVER NITRATE FROM SILVER RESIDUES.

THE silver residue, which is assumed to be chloride (or is previously converted into chloride), is treated, according to a method recently given by R. Dietel, in the following manner:

It is first reduced to metallic silver in the usual way by means of metallic iron and dilute hydrochloric acid. Since chloride of silver is somewhat soluble in hydrochloric acid, the whole of the latter must be combined with iron. When the reduction is completed, the metallic silver mixed with the excess of the metallic iron is washed until the washings no longer show a chlorine reaction. The metallic mixture is now dissolved in nitric acid, producing a solution of ferric nitrate and silver nitrate, which is divided into two uneven portions. The smaller one of these is heated to boiling, precipitated by soda, and the precipitated oxide of silver washed on a filter until every trace of alkali has disappeared. The larger portion is evaporated to dryness, and then carefully fused so as to partly decompose the ferric nitrate present. When the mass is in quiet fusion it is allowed to cool and treated with water, which dissolves the silver nitrate and leaves ferric oxide behind. Next, the solution is mixed with a little nitric acid, to convert any silver nitrite which might have been formed into silver nitrate. Should it be still colored from the presence of some undecomposed ferric nitrate, the solution is boiled and treated with the silver oxide obtained in the first operation, until all the iron is precipitated as oxide. The solution is now again evaporated to dryness, the residue dissolved in water, the solution allowed to deposit suspended matters, then filtered, and finally concentrated to the point of crystallization.—After *Pharm. Zeit.*, No. 2.

Eleven hundred years before the Christian era the Chinese were printing dictionaries, and yet to this day they have not words enough in their language to adequately express their contempt for American politicians.

THE VELOCITY OF LIGHT.

LIGHT moves with the amazing velocity of 185,000 miles a second, a speed a million times as great as that of a rifle bullet. It would make the circuit of the earth's circumference, at the equator, seven times in one beat of the pendulum.

For a long time light was thought to be instantaneous, but it is now known to have a measurable velocity. The discovery was first made by means of the eclipses of Jupiter's satellites.

Jupiter, like the earth, casts a shadow, and when his moons pass through it, they are eclipsed, just as our moon is eclipsed when passing through the earth's shadow. Jupiter's shadow far surpasses in magnitude that of the earth. His moons revolve around him much more rapidly than our moon revolves around the earth, and their orbits are nearly in the plane of the planet's orbit. Consequently they all, with the exception of the fourth and most distant satellite, pass through the planet's shadow, and are eclipsed at every revolution.

Roemer, a Danish astronomer, made, in 1675, some curious observations in regard to the times of the occurrences of these eclipses. When Jupiter is nearest the earth, the eclipses occur about sixteen minutes earlier than when he is most distant from the earth. The difference in distance between the two points is about 185,000,000 miles, the diameter of the earth's orbit, or twice her distance from the sun.

It takes light, therefore, sixteen minutes to traverse the diameter of the earth's orbit, and half that time to span the distance between the sun and the earth. Light is thus shown to travel 185,000 miles in a second, and to take eight minutes, or, more exactly, 500 seconds, in coming from the sun to the earth.

It follows that we do not see the sun until eight minutes after sunrise, and that we do see him eight minutes after sunset. When we look at a star we do not see the star as it now is, but the star as it was several years ago. It takes light three years to come to us from the nearest star; and were it suddenly blotted from the sky, we should see it shining there for three years to come.

There are other methods of finding the velocity of light, but the satellites of Jupiter first revealed its progressive movements.

WHY THE HOURS AND MINUTES ARE DIVIDED INTO SIXTIETHS.

IN the work of time notation, the mechanism of timepieces is so constructed as to make 60 divisions of each of the 60 minutes constituting an hour. No doubt people often wonder why our hour is divided into those 60 minutes, and that the latter also contain the same number of subdivisions each. The answer may be given in this way: That it came from a curious combination of systems of notation in ancient Babylon. In that great center of ancient civilization there appears to have existed, by the side of the decimal system of notation, another system, the sexagesimal, which counted by sixties. Why that number should have been chosen is clear enough, and it speaks well for the practical sense of those ancient Babylonian merchants. There is no number which has so many divisions as 60. The Babylonians divided the sun's daily journey into 24 parasangs, or 720 stadia. Each parasang, or hour, was divided into 60 minutes. A parasang is about a German mile, and Babylonian astronomers compared the progress made by the sun during one hour, at the time of the equinox, to the progress made by a good walker during the same time, both accomplishing one parasang. The whole course of the sun during the 24 equinoctial hours was fixed at 24 para sangs, or 720 stadia, or 360 degrees. The system was handed on to the Greeks, and Hipparchus, the Greek philosopher who lived 150 years before our era, introduced the Babylonian hour into Europe. Ptolemy, 300 years later, gave still wider currency to the Babylonian way of reckoning time. It was carried along on the quiet stream of traditional knowledge through the middle ages, and, strange to say, it sailed down safely over the Niagara of the French revolution. For the French, when revolutionizing weights, measures, coins and dates, and subjecting all to the decimal system of reckoning, were induced by some unexplained motive to respect our clocks and watches, and allowed our dials to remain sexagesimal—that is Babylonian—each hour consisting of 60 minutes. Here we see the wonderful coherence of the world, and how what we call knowledge is the result of an unknown tradition of teaching descending from father to son.

The Editorial Dropshutter.

THE FIRST DAGUERREOTYPE PORTRAIT. — The *Manchester Guardian* (England), of August 19, 1892, publishes a lengthy editorial in which exception is taken at our statement that "Robert Cornelius, of Philadelphia, obtained the first picture of a human face by Daguerre's process in the world, *November*, 1839, in Philadelphia," the *Guardian* claiming the honor for Professor John William Draper, who was a native of Lancaster, England, but who emigrated to the United States in 1833.

The conclusions of the *Guardian's* leader are based upon the summary of our historical retrospect, as published in the *Public Ledger* of Philadelphia, August 11, 1892, under the title "Dawn of Photography." Had the *Guardian* writer read the retrospect in full as published in the *American Journal of Photography*, he would not have fallen into the error.

By reference to page 243 of our present volume it will be seen that special pains are taken to disclaim any attempt to detract from Professor Draper any honor justly due him in the field of photography. However, as to obtaining the first portrait, the facts of the case are incontrovertible, and all against Professor Draper. In the third and fourth papers, on pages 361 and 403 of the *American Journal of Photography*, the details of Professor Draper's experiments are fully set forth, and by reference to the authorities quoted, it will be seen at once that Professor Draper's first crude attempts at portraiture were some months after the perfect Daguerrean miniatures of Cornelius were shown before the American Philosophical Society, at Philadelphia, as is attested by the minutes of *December* 6, 1839.—J. F. S.

THE HELIOCHROMOSCOPE.—The researches and experiments in heliochromy of Mr. Fred. E. Ives of this city have culminated in the production of a compact and portable apparatus in appearance somewhat like the parlor stereoscope. In this apparatus the views are seen through a large magnifying eye-piece in the exact colors of nature, by light entering from without.

Mr. Ives in his descriptive circular states, viz.: The heliochromoscope is an optical device in which a special triple photograph, which may be called a chromogram, reproduces the light and shade and colors of nature as readily and as perfectly as the phonograph and its phonogram reproduce sounds.

As the phonogram is a mechanical record of sounds, so is the chromogram a photographic record of light and color. As the phonograph translates the mechanical sound-record into sound, so does the heliochromoscope translate the photographic color-record into color.

The chromogram is a photograph made in a special camera, with no more operations than are required to make an ordinary photograph, but consists of three images instead of one, and in the production of these three images the light, acting through selective color-screens, registers its colors by making the lights and shades of the three pictures represent the relative effect upon the three fundamental color-sensations, according to the modern theory of color-vision.

Six chromograms accompany each apparatus. Extra chromograms of varying subjects may also be obtained. A special lamp for night illumination is also furnished.

A Mammoth Camera.—Mr. Charles H. James, a professional photographer of Philadelphia, who is also an ingenious mechanic, during the present year built himself a camera for large railroad work and interior photography, which would give panoramic views 24x36 inches with out any curvature in the foreground, and be actually true and rectilinear in every way.

The frame of this camera is made of mahogany, and measures 45x50 inches, and has an extension of 60 inches. The bellows are covered with morocco, eight goat skins being used in its construction ; it is built on the front focus principle. The weight of the box, independent of the two trestles which support the bed, is over 150 pounds.

The double plate holder used weighs over 25 lbs. empty, and when loaded with two plates, tips the scales at between 75 and 80 pounds. Mr. James, to obtain a perfectly plane surface, uses heavy French plate glass, which is coated to his order.

The lens used in this photographic monster is a Bausch & Lomb, Zeiss astigmat, 24 in. eq. focus, covering an angle of almost 90°.

THE HELIOCHROMOSCOPE.*

BY F. E. IVES.

IT was in 1888 that I first described and demonstrated, at the Franklin Institute, a method of reproducing the natural colors by photography, which differed in certain vitally important particulars from somewhat similar processes which had already been carried out by Cros and Du Hauron in Paris, Albert in Munich, Bierstadt in New York, and others. I succeeded in reproducing the natural colors in landscapes and various objects with a degree of accuracy which I have good reasons to believe had never before been approached by any method without the intervention of the artist's brush. The procedure was, however, too complicated and difficult for profitable commercial application, and comparatively few specimens were made.

I now present to your notice devices which so greatly simplify the operation of the process as to make it quite possible to place it in the hands of even the "press-the-button" class of amateur photographers, and yet yield results that are no more defective in color-rendering than the ordinary photograph is in the rendering of monochrome light and shade.

The first of these devices is a camera attachment by means of which the three pictures representing the effect upon the fundamental color-sensations are made by a single exposure on a single sensitive plate, and from a single point of view. The device as now perfected is surprisingly simple, being comprised in a small box which may be attached to the front board of an ordinary camera. The division of the light-ray is effected by transparent mirrors, as in some of my earlier cameras, but in such manner as to dispose the images symmetrically on a single plane, without altering the position of the camera in relation to the object.

The second device, which I call a heliochromoscope, contains the same arrangement of mirrors, turned about so as to serve to recombine the three photographs in such manner that the photographic color-record is translated into color again as readily as the sound record in the phonogram is translated into sound in the phonograph.

The most important advantage of this device is that it may be used at any time, at a minute's notice, like the stereoscope; and as almost everybody may possess one it is competent to make the realization of color-photography a household affair. It also more completely fulfils the theoretical conditions of success than either the production of color-prints or lantern projections, and produces an illusion of nature more perfect than would be possible with even an absolutely-perfect color-

* Read before the Photographic Society of Philadelphia, October 12th, 1892.

print on paper, because the picture is seen without surface reflections or distracting surroundings.

I claim for this system of color-photography that it is perfectly rational and scientific, and a true solution of the problem of reproducing the natural colors in a photographic picture. This claim meets with a good deal of opposition in the minds of some people, whose mental attitude is a source of wonder to me, because the same sort of objections that are made to the triple photograph would apply to the stereogram and the phonogram. One is an automatic record of color, another of binocular vision, and another of sound; each must be placed in a special device in order to reproduce that which it has recorded,—the triple photograph or chromogram into the heliochromoscope, the stereogram into the stereoscope, and the phonogram into the phonograph. I do not remember ever to have heard the stereogram denounced because it is not a single print with embossed relief, or the phonogram because it has no lungs.

Some even go so far as to deny that this can properly be termed color-photography at all, although the same individuals are in the habit of calling pictures that cannot be made to show colors "orthochromatic" or correct color photographs. But the most extreme illustration of this peculiar attitude of the mind that I have seen, is the assertion of one who, if I am not mistaken, has aspired to be the historian of photography, that this is merely "looking at ordinary photographs through bits of colored glass!" To be consistent, this writer should describe the stereogram as "two ordinary photographs mounted on the same card," and the phonogram as a "wax cylinder having a roughened surface like an ordinary file." I believe he did recently write a history of photography, with "an introduction to its latest developments," without once mentioning color-sensitive plates.

I speak of this kind of criticism because it comes from men whose writings are in demand, and proves the existence of a deep-seated prejudice, which I have encountered in the development of other applications of photography, and which must be combated in order to overcome it. I will give an illustration: When, in 1880, I succeeded in realizing a mechanically accurate and practical method of half-tone block-making, I could find only one engraver who believed that there was a future for processes that rendered the shading in equally spaced graduated lines and cross-lines. Engravers, printers, publishers and photographers were agreed that if a block be made of lines, those lines must follow the contours of the object depicted, as in the conventional wood-engraving. Since that could not be done, a grain similar to

the well-known lithographic-grain, must be substituted for the line-tint. I declared that the objection to a regularly-lined tint was a prejudice, stuck to it, and already, within twelve years, plates having that same lined tint have come into such extensive use as to replace millions of dollars' worth of engravings. They are used in illustrating books and periodicals of the highest class, and the advantages of the mechanical-lined tint are such that it threatens even to invade the domain of photogravure. Mr. Louis Levy exhibited such results at the last monthly meeting of the Franklin Institute, and I myself applied for a patent on a printing-plate of this character more than a year ago, having first experimentally demonstrated certain important advantages which they can be made to possess.

We did not make half-tone printing-plates of the kind that engravers and printers and publishers thought they must have, but they have concluded to take what we make, and are taking them more and more every year.

We have not made photographs in the natural colors of exactly the kind that people have been looking for, and there is good reason to doubt if such a result will ever be accomplished; but we have actually realized, by a process almost as simple as stereoscopic photography, results better than can even be hoped for in color-prints, and so perfect that they must ever represent the standard which results by any other method must be made to approach in order to be acceptable. A good many people seem to think that this is not what they want; but I have quite as much faith in the future of the heliochromoscope as I ever had in the future of half-tone block-making in line. It has been a revelation to me, and I believe it will be to the whole world. I met a professional artist in London, a clever painter of both portraits and landscapes, who spent what seemed to me a very long time studying a bouquet of flowers reproduced in the heliochromoscope, and left it only to return to it again and again, as if it fascinated him. At last a friend asked him for an expression of opinion upon the merits of the device. After some hesitation, he said that he had attended one of my lectures at the Royal Institution, hoping and expecting to go away and report the failure of another attempt to reproduce the natural colors by photography. He had not been able to do so, but was forced to confess that color photography is a fact. The demonstration was conclusive to him. The heliochromoscope will have no better friends than the artists, for whom it will not only reproduce Nature, but Art as well, in such manner that they can be studied in far-distant lands almost as well as in the galleries where they repose.

In the far West I met the representative of a large New York firm of importers of Oriental rugs. He assured me he was ready to pay a hundred dollars out of his own pocket for a duplicate of the heliochromoscope that I showed him, with a set of photographs of the rugs that he carried about with him only to show their colors. It would save his firm a good deal of money that went in expensive rugs, and in cost of extra baggage, and it would save him a good deal of trouble. A professional house decorator spoke much to the same effect. Evidently, the heliochromoscope will have many fields of usefulness,—so many, perhaps, that its function as a source of drawing-room entertainment, for which alone many have supposed it to be adapted, will prove of secondary importance. But I shall be greatly surprised if, even for the latter purpose, it does not become more popular than the stereoscope ever was, although it is necessarily a much more expensive instrument.

Prof. Farnam on the Genus Amateur.—A most interesting lecture was lately delivered in the mechanics' course at New Haven, Conn., by Prof. Henry W. Farnam, on "The Amateur Photographer." The audience was very large. Many pictures taken by Frederick E. Hotchkiss, Morris F. Tyler and other amateur photographers of New Haven were shown with the stereopticon. Among these pictures was one of Stagg, Yale's famous pitcher, which brought forth much applause, and two of the lecturer himself, in different positions on the same plate. "There is a law of physics," said Professor Farnam, "that two bodies cannot occupy the same space at the same time, but here is one body occupying two spaces at one time."

"Photography properly," he continued, "dates from 1840, although several discoveries in the art were made before this time. Still, everything can be shown to be old, and I propose to show that the photographic art was practiced by Egyptians 4000 years B. C. The great pyramid must have been a photographic laboratory. It contained a dark room, and the dictionary defines a dark room as a place in which photographic plates are developed. Hence, the Egyptians must have been photographers. Cheops, the builder of this pyramid, was probably the first amateur photographer.

"No person who cannot develop his own plates deserves the name of amateur. Such a person bears the same relation to the real photographer, as the organ-grinder does to the skilled musician. The ama-

teur photographer has his enemies, and these enemies are the people he photographs and himself. Recently a foreigner who tried to snap a detective camera on the Sultan was arrested, and would have been strangled if it had not been for the interposition of his country's ambassador. Once I, myself, tried to photograph some Crow Indians. They were splendid specimens for a picture, dressed as they were in buckskins and blankets, and wearing three pairs of earrings. Coming to the conclusion that there was bad medicine in my apparatus, one big buck came up, and, pushing against the tripod, said "No!" probably all the English he could command. As they had been rejoicing over a scalp recently lifted, I thought the sacrifice I might have to make was unnecessary, and so desisted.

"But the amateur photographer is his own worst enemy. As a celebrated Frenchman has said, he often buys an expensive photographic outfit before starting on a journey, but forgets to first learn the art. Or, he may begin with a cheap camera, and then realizing the better work he could do with a superior outfit, he resolves to purchase one, and, unless he have a good sized bank account, he may, in his fascinations, go beyond his means.

"About amateurs of New Haven, many interesting lines could be written. The earliest was Robert Fisher, an assistant in the chemical laboratory of this school, who began in 1858. Among others I may mention Henry Blake and Henry A. Dubois. Another was William Boles, a mechanic, who could make every part of a carriage, and also, the tools he worked with. How many there are at the present time, it would be difficult to tell. Some one has said 100; enough, certainly, to form a society to be one with the sixty-nine others in the United States.

Copying Daguerreotypes and Ambrotypes.—In copying old daguerreotypes or ambrotypes, the operator is frequently baffled by a reflection of the different lights upon the subject, which are in turn reflected upon the plate, ruining the negative. The best way to overcome this difficulty, which is especially annoying with ambrotypes, is to shut off all light in the room but one small window, through which the light falls directly upon the subject. Copies obtained by this method uniformly compare favorably with the originals. Another advantage is that if the originals are sharp and bold the copy may be increased to double the size without losing any of the sharpness and detail of the original. It is almost needless to state that no attempt should be made to copy either in the direct sunlight.

Photographic Hints and Formulæ.

(From Dr. Joseph Maria Eder's "Recepte und Tabellen.")

Toning and fixing bath for aristo and similar emulsion papers:

(*a*) Toning and fixing bath for ordinary purple-brown to violet-black tones.

Water	500 c.c.m.
Hyposulphite of soda	200 grams.
Rhodanammonium (sulphocyanate of ammonium)	25 grams.
Nitrate of lead	10 grams.
Alum	20 grams.

Dissolve the hypo in water, then add the Rhodanammonium, then dissolve the alum, and lastly, the nitrate of lead, dissolved in a small quantity of water, warmed to 122° Fht. Allow the whole to settle, after filtering, add for use, to every 100 ccm. of this concentrated solution 7/8 ccm. of a one per cent. solution of chloride of gold, and 100 c.c.m. of distilled water. The bath is now ready for use, and keeps indefinitely.

Chloro-collodion prints must not be washed before toning and fixing; gelatine papers, on the contrary, must be washed a short time in clear water, and at once removed to the toning and fixing bath.

To dilute the concentrated bath old diluted gold baths, which contain little or no gold, can be used to advantage.

In hot summer weather, or by great heat, the above bath has a tendency to tone too rapidly, and produce a greenish-yellow tone. This can be obviated by the addition of a few drops of citric acid (5 : 100) or placing the vessel with the toning-fixing bath on ice.

(*b*) Toning-fixing bath for sepia-brown tones.

Water	1000 grams.
Hyposulphite of soda	100 grams.
Acetate of ammonium	100 grams.
1 per cent. solution chloride of gold	30 ccm.

—*Valenta.*

(*c*) Toning and fixing bath for gelatino-chloride papers, giving lighter tones than formula "A."

Water	200 ccm.
Hyposulphite of soda	35 grams.
Chloride of sodium	9 grams.
Chloride of gold	0.1—0.2 grams.
Alum	4 grams.

Prepare eight to ten days before use.—*Dr. Stolze.*

Hot burnishing of Gelatine Papers.—Dissolve in hot water,

Shavings of ordinary castile soap	20 grams.
Venetian or glycerine soap	10 grams.

then add

Spirits of wine	1 lit.

Filter.

Rub the prints over with this solution, using a wad of cotton wool. Run through the burnisher in the usual manner, as soon as the alcohol has evaporated.

Retouching liquid for Albumin prints.

Quillaja saponaria (soap bark)	10 to 20 grams.
Boiling water	500 ccm.

Pour the water over the crushed bark; filter about two hours, then add

Alcohol	200 c.c.m.
Salicylic acid	10 grams.

Prints prepared with this solution are ready for retouching or water-color.

Enamel for Paper prints of every sort.

Gum Damar	20 grams.
Ether	150 c.c m.
Benzene	150 c.c.m.

The prints are coated similar to a plate with collodion. This lacquer does not require a previous coating of collodion.

Aquarelle paper:

Water	600 parts.
Ammonium-chloride	60 parts.
Arrow-root	20 parts.
Citric acid	3 parts.

Boil, and coat the drawing paper either by coating or floating. To silver, float in the usual manner on a bath 1 : 20. This will give pale copies, suitable for water-color studies. To tone, use a very weak gold bath.

A paper slow-match to ignite blitz-pulver is made by soaking blotting paper in a warm saturated solution of saltpeter, then hang up to dry, and cut into narrow strips. The dry strips keep for months. [It is far safer to use any of the regular apparatus made for the purpose.—ED.]

Mucilage.—To 250 grams concentrated solution of gum-arabic (two parts gum in five parts water) add a solution of 2 grams sulphate of alumina dissolved in 20 c.c.m. water. This mucilage will not penetrate the paper, and will adhere to wood.

Wood Trays to Withstand Acids.—To impregnate and coat large wood trays so as to withstand the action of acids and alkalies, place in a wide mouth jar

Syrian asphalt	2 parts.
Yellow wax	5 parts.
Rosin	1 part.

Add enough turpentine to dissolve into a thick fluid mass, this will require several days. Before coating, saturate the trays with a thin oil varnish. When dry, close the joints with ordinary putty or mass B, given below. When this is done, give first coat of asphalt varnish diluted with turpentine, that it may better permeate into the wood. When dry, repeat four to six times without thinning the asphalt varnish.

(*b*) Cement for joints and cracks.

Asphalt	200 parts.
Calophonium (rosin)	500 parts.
Tallow	100 parts.

are melted in above order, and run into the joints and cracks while it is in a fluid state.

A Medium to Cement Paper to Metals.—Mix in a mortar five parts wheat flour with one part turpentine; when thoroughly incorporated add, under continuous stirring, a warm watery solution of common glue until the whole forms a paste. This cement dries slowly, but possesses extraordinary adhesive properties, and is especially valuable for labeling tin or other metal vessels.

To Polish Glass Plates.—Clean with a mixture of whiting, alcohol, and ammonia, then rub over with diluted alcoholic tincture of iodine.

Mattolein, a retouching fluid for pencil work on varnished plates, dissolve

Dammara rosin	1 part.
Turpentine	5 parts.

for use rub a few drops over the portion to be worked on.

Photographic Scissors and Paste.

The Ruling Passion.—Young Lady—"Mercy me! And so, when fast in the jungle, you came face to face with a tiger. Ooo! What did you do?" Modern traveler (proudly)—"Photographed it."—*New York Weekly.*

A Photographer in the Tyrol made a negative of ten tourists against a background of pine woods, says a writer in the *Argonaut.* When he developed the plate a faithful presentment of a large bear in the act of making for the denser timber, appeared in the edge of the forest. Neither the man with the camera nor any of those in the group had known that the brute was near.

Prof. Barnard has discovered a comet by the aid of photography. It is only a little one, but he will doubtless get the $200 which is the standing price given him for new comets, just the same as if it were a big one picked up in the old way.

Electric Spark Photography.—Professor Vernon Boys lately brought together in the United Presbyterian Church Synod Hall, Edinburgh, a monster audience to hear his lecture, with experiments, on "Electric Spark Photography," relates the London *Public Opinion*. In the course of the lecture Professor Boys explained that by the electric spark, articles moving at the rate of 10,000 miles an hour can be photographed, and by the introduction of a revolving mirror a speed of 180,000 miles an hour can be coped with. The mirror makes 1024 turns evrey second, worked by electricity, which is equal to about 150 times as fast as a rifle bullet travels. The whole photographic power of the spark is over in a time equal to the ten or eleven millionth part of a second, and it is during that incredibly brief space that the image is made on the sensitive plate.

The New U. S.Coins.—It may be useful to our readers to recall the fact that the U. S. fractional silver currency bears a simple relation to the metric sytem, which relation has been made designedly and by law.

The half dollar is equal to	12½	Gm.
The quarter dollar is equal to	6¼	"
The dime is equal to	2½	"
84 half dollars are equal to	1	kilo.

One Day too Early.—A good story comes from a Birmingham photographer. A lady sat for pictures. The next day she returned for the proof, which was given her in an envelope on which was printed, "Return after five days to——, photographer, Birmingham, Ct." The lady kept the proof much longer than persons usually do, particularly as she said she was in a big hurry for the pictures. On the fourth day she came to the studio, bringing the proof, and apologized to the artist for coming back "one day ahead of time," but she said she had business in town, and could not come again. It took the artist a day to understand what she meant.—*New Haven Palladium.*

She—"Speak out, Mr. Prudence, if you have anything to say." He—"No, thank you. There's a phonograph hidden under the center table, your little brother is under the sofa, the servant is listening at the keyhole, and your mother is looking over the banisters. The only thing that restrains me is my doubt as to the whereabouts of your father."

A Photographic Marvel.—After an exposure of thirty-three minutes, the same instrument which renders visible to the human eye stars of the fourteenth magnitude, which in the entire heavens would register about 44,000,000 stars, shows to the photographic eye 134,000,000, and on an exposure of one hour and twenty minutes, would throw before the astonished gaze of the beholder a luminous dust of 400,000,000 stars. Never before in the history of humanity has man possessed the power of penetrating so profoundly into the depths of the infinite.

It is estimated that from eighty to one hundred thousand dollars worth of nitrate of silver and gold is used every year by the photographers of the United States in making the millions of photographs. If this waste could be saved it would bring down the cost of the pictures immensely.

Amateur Photographers, Beware!—Farmer Wayback—Say, wife, han' me out the shotgun, the big horse pistol and my old huntin' knife.

Mrs. Wayback—What d'ye mean, Phelam, by takin' them to the field with ye?

"Well, I understand that there's a band of premature autographers or some kind of outlaws comin' through the country, takin' farms and everything else they set their eyes on. I calc'late to make it pretty lively for 'em if they try to take my farm in broad daylight."

THE PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

A STATED meeting of the Society was held on Wednesday evening, October 12th, 1892, the President, Mr. Joseph H. Burroughs, in the Chair.

Mr. Frederic E. Ives read a paper on the "Heliochromoscope" exhibiting the apparatus and also the special camera in which the negatives, with the necessary triple image taken through a single lens, were made. The wonderful results shown excited the highest admiration and favorable comment from the members present, and at the conclusion of the paper the following resolution was offered by Mr. G. M. Taylor and carried unanimously :—

"Resolved, that the thanks of this Society be extended to our fellow member, Mr. F. E. Ives, for his paper just read, descriptive of further improvements in his wonderful and scientific inventions of camera and Heliocromoscope for reproducing the natural colors in a photographic picture."

Dr. C. L. Mitchell showed a portable divided hand camera, made by Ross & Co., of London. Its principal feature of interest and value consisted in its being provided with a pair of matched lenses, one of which was used as a finder projecting an image on a ground glass the full size of the picture about to be taken with the other lens. This arrangement enabled the picture to be carefully focussed practically at the instant the exposure was made.

Mr. Wm. H. Rau gave a demonstration of the process of making bromide enlargements, using the new apparatus belonging to the Society, in connection with the Welsbach Incandescent Gas Light. In order to overcome the jarring occasioned by heavy machinery in other parts of the building, it was necessary to construct the apparatus with this end specially in view. The stand supporting the apparatus, with the exception of the condensing lenses, rests upon four springs of pure India-rubber. To counteract any motion which might pass through the springs, weights aggregating about 300 pounds rest on the framework of the stand. A second frame is supported on top of the stand on another series of six springs, about 100 pounds of iron weights being placed on this frame. The enlarging camera and board for the paper are rigidly attached to the upper frame. By this contrivance the vibration is entirely overcome, perfectly sharp work being done while the machinery is in active operation.

The Welsbach light used, as described by Mr. Miner, representing the company, consisted of a special burner devised for photographic work, giving a highly actinic light of 175 candle power. By the use

of a parabolic reflector, the effective power of this light was greatly intensified, having been estimated at 600 or 700 candles. The burner was claimed to use but about five feet of gas per hour, making it a very economical light for the purpose as well as a very convenient one, as compared with any form of electric light yet devised.

Mr. Frank S. Lewis mentioned that in developing film negatives, lately, he had noticed that on lifting them out of the tray for examination, at the points where the back of the the film rested on the fingers, the heat of his hand seemed to be communicated through the film so as to accelerate the development at those points. This was particularly noticeable in the skies of the negatives. He had also noticed that with some plates the strong contracting and adhesive power of the gelatine had caused it to pull off part of the outer surface of the glass around the edges of the plate. This seemed to be due to the glue-like character of the gelatine used, and illustrated the process largely used for producing a peculiar rough surfaced glass for decorative purposes.

A member asked why in the case of an interior view, which had an hour and a half exposure, a streak of sun-light which could be assumed to be greatly overexposed, had developed intensely black instead of giving the thin image generally resulting from overexposure.

Dr. Mitchell thought it came from a second reversal of the image at that point, the usual thin image of overexposure being again reversed and showing black.

Mr. C. W. Miller said that if an overexposed negative were developed long enough it would become black all through, as with the streak of sunlight. But, usually with such negatives, they were soon found to be overexposed and the developer modified accordingly, the development being stopped before intense blackness was reached.

A member stated that in photographing in Florida, the Yellowstone Park, and other places where the sky was intensely bright, the skies were almost always overtimed and thin, and asked for a remedy.

Mr. Carbutt recommended washing the plate off when the sky had reached the proper intensity in developing, and then with a tuft of cotton or soft brush continuing to apply the developer to the foreground until a harmonious result was obtained.

Mr. Ives practiced another method, which was to reduce the overdeveloped portion of the negative with Farmer's Solution applied in a similar manner to that recommended by Mr. Carbutt. This he did after fixing, and in daylight, which was quite an advantage.

Adjourned. ROBERT S. REDFIELD, *Secretary.*

In the Twilight Hour.

EXAMPLE is the most powerful rhetoric.

GOD makes afflictions to be but inlets to the soul's more sweet and full enjoyment of His blessed self.

A MAN may as truly say, the sea burns, or the fire cools, as that free grace and mercy should make a soul truly gracious do wickedly.

PROMISES must be prayed over in private; God loves to be sued upon his own bond, when he and his people are alone.

SIN may *rebel*, but it shall never reign in any saint.

FOR a man to have a great name to live, and yet to have but a little life, is a stroke of strokes. To be high in name, and little in worth, is a very sad and sore judgment.

CHRISTIAN, if you would keep humble, if you would lie low, draw forth your artillery, place your greatest strength against the pride of your soul. The death of pride will be the resurrection of humility.

OF all mercies, pardoning mercy is the most sweetening mercy. It is mercy that makes all other mercies look like mercies, and taste like mercies, and work like mercies. He who has it cannot be miserable; he who wants it cannot be happy.

AS the peacock, looking upon his black feet, lets fall his plumes, so the poor soul, when he looks upon his black feet, the vanity of his mind, the body of sin that is in him, his proud spirit falls low.

AN HUMBLE soul knows, that to bless God in prosperity, is the way to increase it; and to bless God in adversity is the way to remove it.

IT was a saying of Austin, "He that willingly takes from my good name, unwillingly adds to my reward."

MERCY is "Alpha," justice is "Omega."

RICHES, though well got, are yet but like to manna; those that gathered less had no want, and those that gathered more found it but a trouble and annoyance to them.

HE who turns not from every sin, turns not aright from any one sin.

SOME degree of comfort follows every good action; as heat accompanies fire, or beams and influences issue from the sun.

THE most holy men are always the most humble men; none so humble on earth as those that live highest in heaven.

THOUGHTS are the first-born, the blossoms of the soul, the beginning of our strength, whether for good or evil, and they are the greatest evidences for or against a man that can be.

SUCH as have made a considerable improvement of their gifts and graces, have hearts as large as their heads; whereas most men's heads have outgrown their hearts.

NO saint so like a sinner as a weak saint.

EARTHLY riches are called thorns, and well they may be; for as thorns they pierce both head and heart; the head with cares in getting them, and the heart with grief in parting with them.

A LITTLE leaven leaveneth the whole lump; a little stuff may kill one; a little leak in a ship sinks it; a little flaw in a good cause mars it; so a little sin may at once bar the door of heaven, and open the gates of hell.

One of the ancients used to say that humility is the first, second and third grace of a Christian.—*Excerpt from Thomas Brooks, Obit. A.D. 1680.*

Literary and Business Notes.

LANSFORD, PA., Sept. 22, 1892.

Messrs. Thos. H. McCollin & Co.,
1030 Arch St., Phila.;

GENTLEMEN: The developer which I recently received from you is *the best* that I have ever used in my many years of business.

I have used it on several plates, and it is *elegant;* receiving the best possible results.

So long as you furnish me with this developer, I shall use no other in my studio; I shall also recommend it to my friends.

Respectfully yours,
RUDOLPH E. NAGEL, *Artist.*

MIS BUENOS TIEMPOS. Memorias de Estudiante. Par Raimunda Cabrera. Second edition, printed and illustrated by the Levytype Company, Philadelphia.

An interesting work in the Spanish language, by Raimund Cabrera, the well-known Cuban novelist. The work does credit to the contracting company, who furnished the edition complete for the author.

"SOLIO" PAPER.—We have received a number of prints from the Eastman Company on the new "Solio" paper. They certainly show a delicacy of tone and clearness in the shadows, equal, if not superior, to any paper in the market. The new paper is well worthy of the attention of every professional photographer.

CRAYON PORTRAITURE, LIQUID WATER COLORS, FRENCH CRYSTALS. By J. A. Barhydt. The Baker and Taylor Co., 740 Broadway, N. Y.

This comprehensive work upon the subjects indicated in the title is the second treatise by the same author. The book is an invaluable guide for the professional as well as amateur who soars behind the hum-drum routine of everyday work. The book embodies the results of over twenty-four years practical experience in studio work, and will prove an invaluable text-book to all students in photographic portraiture.

RECEPTE UND TABELLEN FUR PHOTOGRAPHIE UND REPRODUCTIONSTECHNIC. Von Dr. Josef Maria Eder. Third edition. Wilhelm Knapp, Halle a. S., 1892.

A handy compendium of recipes, formulas, and tables collected from the previous publications of the author, supplemented by a number of new ones. It is without doubt the most valuable handbook for the photographer published in any language.

PHOTOGRAPHIC PATENTS.

The following list of patents relating to the Photographic interests, is specially reported by Franklin H. Hough, Solicitor of American and Foreign Patents, No. 925 F. Street, N. W., Washington, D. C., who will furnish copies of patents for 25 cents each.

ISSUE OF AUGUST 30TH, 1892.

481,802.—Camera Plate-Attachment. George L. Minear, Ottumwa, Iowa.

Issue of September 6th, 1892.

482,002.—Photographic Background-Holder. Alvin C. Caswell, Fitchburg, Mass., assignor to Nashua Iron and Brass Foundry Company, Nashua, N. H.

Issue of September 13, 1892.

There were no Photographic Patents contained in this issue.

Issue of September 20th, 1892.

482,854.—Photographic-Shutter. John E. Thornton, assignor of one-half to E. Pickard, Manchester, England.

482,978.—Photographs, pictures, and analogous articles, support for. Andrew Hunter, Chicago, Illinois.

Issue of September 27th, 1892.

483,135.—Photographic Lenses, Diaphragm for. Edgar R. Bullard, Wheeling, West Virginia.

483,280.—Picture Stretcher, Folding. Edward R. Butler, Ueberlinger, Germany.

Issue oe October 4th, 1892.

483,688.—Photographic Cameia. Fiederick A. Hetherington, Indianapolis, Ind.

483,606.—Photographic Purposes, device for modifying and controlling rays of light for Amasa P. Flaglor, assignor to H. Flaglor, San Francisco, Cal.

Issue of October 11th, 1892.

484,179.—Cameras. Finder sttachment for William B. Cogswell, Syracuse, N. Y.

484,165.—Photographer's Background-Holder. William I. Scandlin, Brooklyn, New York.

484,175.—Photographic Printing Frame. Frederick O. Bynoe, London, England.

Issue of October 18th, 1892.

484,456.—Camera-Shutter. Henry C. Platt, Nantucket, Mass.

484,699.—Photographic Dark-Chamber. Isaac Bryner, Callaway, Nebr.

484,569.—Photographic-Plate Holder. Arthur M. Pierce, Brooklyn, assignor to Eastman Kodak Company, Rochester, N. Y.

Issue of October 25th, 1892.

There were no photographic patents included in this issue.

THE METRIC SYSTEM.*

FRENCH FLUID MEASURES.

THE cubic centimetre, usually represented by "c.c.," is the unit of the French measurement for liquids. It contains nearly seventeen minims of water; in reality, it contains 16.896 minims. The weight of this quantity of water is one gramme. Hence it will be seen that the cubic centimetre and the gramme bear to each other the same relation as our drachm for solids and the drachm for fluids. The following table will prove to be sufficiently accurate for photographic purposes:

1	cubic centimetre	=	17	minims (as near as possible).							
2	cubic centimetres	=	34	"							
3	"	=	51	"							
4	"	=	68	"	or	1	drachm	8	minims.		
5	"	=	85	"	"	1	"	25	"		
6	"	=	102	"	"	1	"	42	"		
7	"	=	119	"	"	1	"	59	"		
8	"	=	136	"	"	2	drachms	16	"		
9	"	=	153	"	"	2	"	33	"		
10	"	=	170	"	"	2	"	50	"		
20	"	=	340	"	"	5	"	40	"		
30	"	=	510	"	"	1	ounce	0	drachm	30	minims.
40	"	=	680	"	"	1	"	3	drachms	20	"
50	"	=	850	"	"	1	"	6	"	10	"
60	"	=	1020	"	"	2	ounces	1	"	0	"
70	"	=	1190	"	"	2	"	3	"	50	"
80	"	=	1360	"	"	2	"	6	"	40	"
90	"	=	1530	"	"	3	"	1	"	30	"
100	"	=	1700	"	"	3	"	4	"	20	"

THE CONVERSION OF FRENCH INTO ENGLISH WEIGHT.

Although a gramme is equal to 15.4346 grains, in the following table it is assumed to be 15 2-5 grains, which is the nearest approach that can be made to *practical* accuracy:

1	gramme	=	15 2-5	grains.					
2	grammes	=	30 4-5	"					
3	"	=	46 1-5	"					
4	"	=	61 3-5	"	. . . . or	1	drachm	1 3-5	grains.
5	"	=	77	"	. . . . "	1	"	17	"
6	"	=	92 2-5	"	. . . . "	1	"	32 2-5	"
7	"	=	107 4-5	"	. . . . "	1	"	47 4-5	"
8	"	=	123 1-5	"	. . . . "	2	drachms	3 1-5	"
9	"	=	138 3-5	"	. . . . "	2	"	18 3-5	"
10	"	=	154	"	. . . . "	2	"	34	"
11	"	=	169 2-5	"	. . . . "	2	"	49 2-5	"
12	"	=	184 4-5	"	. . . . "	3	"	4 4-5	"
13	"	=	200 1-5	"	. . . . "	3	"	20 1-5	"
14	"	=	215 3-5	"	. . . . "	3	"	35 3-5	"
15	"	=	231	"	. . . . "	3	"	51	"
16	"	=	246 2-5	"	. . . . "	4	"	6 2-5	"
17	"	=	261 4-5	"	. . . . "	4	"	21 4-5	"
18	"	=	277 1-5	"	. . . . "	4	"	37 1-5	"
19	"	=	292 3-5	"	. . . . "	4	"	52 3-5	"
20	"	=	308	"	. . . . "	5	"	8	"
30	"	=	462	"	. . . . "	7	"	42	"
40	"	=	616	"	. . . . "	10	"	16	"
50	"	=	770	"	. . . . "	12	"	50	"
60	"	=	924	"	. . . . "	15	"	24	"
70	"	=	1,078	"	. . . . "	17	"	58	"
80	"	=	1,232	"	. . . . "	20	"	32	"
90	"	=	1,386	"	. . . . "	23	"	6	"
100	"	=	1,540	"	. . . . "	25	"	40	"

* Published by request.